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XLVII. *A ready Way of lighting a Candle, by a very moderate Electrical Spark.* By John Ingenhoufz, M. D. F. R. S.

Read July 9, 1778. **I**T has been long known that an electrical spark will kindle spirit of wine, especially when previously warmed; and that vitriolic æther will be kindled by a very moderate spark, even when cold. However, I never saw an electrician who made a common use of this experiment to light his candle when he had occasion for it. The reason is, because though it may be done without much danger of failing in the attempt, yet it requires some trouble to prepare every thing necessary for making the experiment answer with certainty. Besides, æther is very precious, and is easily lost by evaporation before the electric power is excited, or before every thing is quite ready for performing the experiment.

I used to light my candle a good while ago by the explosion of a *small* jar (by small I understand one which

has eight or ten inches of metallic coating, or even less) in the following manner. As I often amuse myself with electrical experiments, I have always an electrical machine, ready for action, fixed upon a table in my room. When I have occasion to light a candle, I charge a small coated phial, whose knob is bent outwards, so as to hang a little over the body of the phial; then I wrap some loose cotton over the extremity of a long brass pin or a wire, so as to stick moderately fast to its substance. I next roll this extremity of the pin, wrapped up with cotton, in some fine powder of resin (which I always keep in readiness upon the table for this purpose, either in a wide-mouthed phial or in a loose paper); this being done, I apply the extremity of the pin or wire to the external coating of the charged phial, and bring, as quickly as possible, the other extremity, wrapped round with cotton, to the knob: the powder of resin takes fire, and communicates its flame to the cotton, and both together burn long enough to light a candle. As I do not want more than half a minute to light my candle in this way, I find it a readier method than kindling it by flint and steel, or calling a servant.

I have found, that powder of white or yellow resin lights easier than that of brown.

The

The *farina lycopodii* may be used for the same purpose, but it is not so good as the powder of resin, because it does not take fire quite so readily, requiring a stronger spark not to miss; besides, it is soon burnt away.

By dipping the cotton in oil of turpentine, the same effect may be as readily obtained, if you take a jar somewhat greater in size. This oil will inflame so much the readier if you strew a few fine particles of brass upon it. The pin dust is the best for this purpose; but as this oil is scattered about by the explosion, and, when kindled, fills the room with much more smoke than the powder of resin, I prefer the last.

This experiment may be made use of for lighting a candle in the night as well as in the day. But for this purpose a charged phial should always be kept in readiness, and placed where it may be easily found in the dark. The jar for this purpose should be furnished in the manner invented by Mr. CAVALLO, with a glass tube at the inside, reaching from the mouth of the phial to the bottom, through which tube the wire which establishes the communication with the inward coating passes, which, as soon as the phial is charged, is to be taken away, by holding it by the piece of sealing wax, or glass rod covered with sealing wax, fastened to the knob of

the wire, which wire is only to be put into the glass tube again when the phial is to be discharged.

Mr. CAVALLO finds, that this jar will keep its charge a month, if the glass tube, and likewise the jar where it is not coated, are carefully lined with sealing wax both within and without.

A jar, containing six or eight pints, fitted up in this manner, may be kept as a magazine of electrical fire, and a little coated phial, just big enough to light a candle, may be occasionally applied to it on purpose to light the powder of resin. As soon as this little phial is charged, which is done in an instant, the wire must be taken out of the large jar or magazine, to keep the remainder of the charge, which may serve afterwards for several charges of the little phial.

I have often carried in my pocket such a little jar a whole day, on purpose to fire a kind of pistol loaded with inflammable air in the manner described by Mr. VOLTA of Como. A phial of about two ounces contained electrical fire enough to kindle such a pistol twenty times. In order to take out only as much of the electrical charge as was wanted for this purpose, I plunged into the glass tube of the charged phial a small glass tube, four inches long, adapted as a Leyden phial, by sticking

in it at the bottom, which is hermetically sealed, a bit of tin foil, an inch long, coiled up, and pasting a similar bit at the outside: a thin wire passed through the tube from the inside tin foil to the opening, which was shut by a smooth brass ball stuck to it, and in contact with the said wire. The outside part of this tube, which was not coated with tin foil, was lined or varnished with sealing wax.

